

Message Text

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ACTION SS-25

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S E C R E T MOSCOW 15158

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TAGS: PARM, US, UR

SUBJECT: TTBT/PNE NEGOTIATIONS: FURTHER DISCUSSION OF YIELD
MEASUREMENT

TTBT/PNE DELEGATION MESSAGE NO. 67

1. SUMMARY. WORKING GROUP II HAD FURTHER DISCUSSION OCTOBER 21 OF SOVIET DISCRETE METHOD AND US SLIFER METHOD OF YIELD DETERMINATION WITH SOVIET EXPERT VOLKOV AGAIN IN ATTENDANCE. US SIDE GAINED IMPRESSION FROM DISCUSSION THAT SOVIETS MAY HAVE USED MEASUREMENTS IN SONIC REGION FOR YIELD DETERMINATION, BUT NOT IN HYDRODYNAMIC ZONE. END SUMMARY.

2. WORKING GROUP II MET 3:00PM, OCTOBER 21 TO CONTINUE WORK ON DEVELOPING AD REFERENDUM BRACKETED TEXT (MOSCOW 15153) AND TO DISCUSS FURTHER SOVIET DISCRETE METHOD AND US SLIFER METHOD FOR YIELD VERIFICATION. SOVIET EXPERT VOLKOV AGAIN PRESENT.

3. US DISPLAYED SANDIA/LASL SLIFER FOR BENEFIT OF VOLKOV, WHO BEGAN ASKING MANY QUESTIONS REGARDING CHARACTERISTICS OF SLIFER SYSTEM AND METHOD OF YIELD CALCULATION. HE ASKED WHETHER ACCURACY OF SHOCK POSITION DETERMINATION IS BETTER NOW THAN 0.5 METER REPORTED IN 1965, CLAIMING SUCH AN ACCURACY UNSATISFACTORY FOR YIELD DETERMINATION. US SAID ACCURACY IS BETTER THAN THIS, BUT DID NOT GIVE CURRENT ACCURACY OF POSITION DETERMINATION

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AND DID NOT AGREE THAT SUCH AN ERROR IS SIGNIFICANT WHEN A LARGE

NUMBER OF DATA POINTS ARE AVAILABLE AS WITH SLIFER. VOLKOV ALSO ASKED IN WHAT TYPES OF ROCK AND CORRESPONDING DENSITIES SLIFER HAS BEEN USED, AS WELL AS TYPES OF STEMMING MATERIALS OR GROUT USED. US RESPONDED WITH DESCRIPTION OF WIDE RANGE OF ROCK TYPES AND STEMMING CONDITIONS. VOLKOV ALSO ASKED IF CONVERSION OF FREQUENCY TO DISTANCE AS MADE IN DOWNHOLE PACKAGE. US REPLY DESCRIBED METHODS BY WHICH SUCH CONVERSION IS MADE FOR VARIOUS RECORDING VARIANTS.

4. US THEN DISPLAYED LLL SLIFER WITH STATEMENT THAT IT IS OF MORE RECENT DESIGN, CAPABLE OF HIGHER PRSSURE APPLICATION, AND CONTAINS IMPROVEMENTS IN CIRCUIT DESIGN. SOVIETS ASKED ABOUT PRESSURE AND TEMPERATURE TESTING OF BOTH DESIGNS, AND NUMBERS PROVIDED IN STATE 247975 WERE PROVIDED.

5. US THEN ASKED NUMBER OF QUESTIONS TO CLARIFY PREVIOUS DISCUSSION AND GO INTO MORE DETAIL. ASKED TO CHARACTERIZE FREQUENCY CHARACTERISTICS OF SOVIET SIGNAL CABLES, VOLKOV REPLIED 1 KM OF THEIR CABLE IS CAPABLE OF TRANSMITTING 50-100 KILOHERTZ SIGNALS WITHOUT SIGNIFICANT ATTENUATION. AKSED TO CLARIFY NUMBERS ON PULSE SHAPE AND RESOLUTION CAPABILITY, VOLKOV REPLIED PULSES TYPICALLY WERE OF 1-5 MICROSECONDS HALF-WIDTH, AND WERE SPACED 50-100 MICROSECONDS APART. HE CLAIMED RESOLUTION OF TIME INTERVAL BETWEEN PULSES WAS ABOUT 1 PERCENT OF TIME INTERVAL (I.E. ABOUT 1 MICROSECOND).

6. US SIDE ASKED IF VALUE GIVEN BY VOLKOV FOR REQUIRED TIME INTERVAL BETWEEN EXPLOSIONS IN MILLISECONDS OF 0.1 TIMES CUBE ROOT OF YIELD FOR COLINEARLY-ARRAYED SEQUENTIAL EXPLOSION WAS CORRECT. US CITED NUMBER OF 1.5 TIMES CUBE ROOT OF YIELD REQUIRED IN PROTOCOL II. VOLKOV READILY AGREED 0.1 WAS PROBABLY TOO SMALL FOR ACQUIRING ADEQUATE VERIFICATION DATA, BUT THAT PRIMARY CONCERN OF SOVIET SIDE IN ESTABLISHING THIS CONDITION WAS TO PROTECT NEXT EXPLOSIVE IN SEQUENCE. SOVIET SIDE OFFERED TO CHANGE 0.1 TO 0.5 BUT THEN, AFTER DISCUSSION, SOVIET SIDE SUGGESTED 1.0. US SIDE SAID WOULD CONSIDER. (COMMENT: THIS DISCUSSION CONDUCTED IN CONTEXT OF SOVIET SPACING CRITERION OF 6 TIME CUBE ROOT OF YIELD FOR COLINERAR SEQUENTIAL EXPLOSIVES. END COMMENT.)

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7. US ASKED CLARIFICATION OF SPACING AND POSITION ALONG MOUNTING PIPE OF SOVIET SWITCHES. VOLKOV SAID THEY USE TWO PARALLEL SETS OF SWITCHES, EACH CONSITING OF 10 TO 14 SWITCHES, FOR TOTAL OF 20 TO 28 SWITCHES IN EACH APPLICATION, PLACED BETWEEN END OF CANISTER AND MAXIMUM DISTANCE FROM CANISTER IN METERS OF 6-10 TIMES CUBE ROOT OF YIELD.

8. BEZUMOV ASKED HOW MANY SLIFERS US USED PER SHOT. REPLY WAS

TYPICALLY TWO EACH IN PARALLEL FOR RELIABILITY. SOVIET SIDE
READILY AGREED WITH CONCEPT OF USING DUPLICATE SYSTEMS.

9. DURING ABOVE DISCUSSION US REHEARSED METHOD OF YIELD
CALCULATION FROM R VERSUS T DATA, EMPHASIZED IMPORTANCE OF
SENSING INSTRUMENT BEING LOCATED IN REGION OF HYDRODYNAMIC SHOCK,
AND MANNER IN WHICH OUTER BOUNDARY OF HYDRODYNAMIC REGION (TRANSITION
TO SONIC REGION) VARIES WITH ROCK TYPE. VOLKOV DISPLAYED GREAT
INTEREST AND TOOK MANY NOTES. (COMMENT: WHILE VOLKOV READILY
UNDERSTOOD CONCEPT BEING DESCRIBED, HIS STEMMING MATERIALS
LEADS DELEGATION TO IMPRESSION SOVIET METHOD MIGHT HAVE BEEN
USED IN PRACTICE TO MAKE MEASUREMENTS IN SONIC REGIONS BUT NOT
USED FOR YIELD MEASUREMENTS IN HYDRODYNAMIC REGION. WHEN QUERIED
REGARDING SOVIET METHODOLOGY OF YIELD CALCULATION FROM R VERSUS T
DATA, VOLKOV ONLY REPLIED THAT METHOD SIMILAR TO US METHOD BUT
WITH SLIGHTLY DIFFERENT CONSTANTS. ALTHOUGH SOVIETS HAVE STATED
THAT YIELD DETERMINATION SHOULD BE BASED ON MEASUREMENTS IN
HYDRODYNAMIC ZONE, IT IS POSSIBLE THAT SOVIETS HAVE HAD NO
PRACTICAL EXPERIENCE IN THIS REGION. END COMMENT.)

10. WORKING GROUP THEN AGAIN EXAMINED SOVIET EQUIPMENT. DISCUSSION
REVEALED THAT, IN SOVIET DESIGN, SO-CALLED SWITCH IS ONLY RUBBER
SEALING PLUG AND END OF WIRE. SIGNAL IS PRODUCED BY CRUSING OF
WIRE AGAINST STEEL BACKING PLATE BY SHOCK WAVE. VOLKOV SAID
HYDROSTATIC PRESSURE CAPABILITY OF CABLE IS 500 ATMOSPHERES IN
CONTRAST TO 800 ATMOSPHERES STATED PREVIOUS DAY. REEXAMINATION
OF CABLE BY US REINFORCED PREVIOUS IMPRESSION THAT CABLE
NOTHING MORE THAN SHIELDED AUDIO CABLE; CENTER CONDUCTOR ABOUT
NO. 18 WIRE; INSULATION SOLID POLYETHYLENE TUBE ABOUT ONE-
SIXTEENTH INCH DIAMETER. VOLKOV SAID THAT SYSTEM WAS USED AT
DEPTH OF 2,400 METERS ON PAMUK EXPLOSION.
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